HAMATEUR CHATTER

The Milwaukee Radio Amateurs Club

September 2009, Volume 17, Issue 9

One of the World's Oldest Continuously Active Radio Amateur Clubs—since 1917

Presidents Letter

CW. Continuous Wave. Morse Code. The "original" digital mode. The original mode period. This is what many think (inside and outside the hobby) when they think of amateur radio. For most of that group the last thing they think of is… mobile.

THIS is what we shall learn about at this month's meeting. Pat Hoppe WW9R will present a program on operating mobile CW. For someone that doesn't do code very well with pencil and paper in hand, at a desk, with a 599 signal and a good fist on the other end it will be very interesting to see what it takes to get it done while mobile (as in driving and operating). Even if you aren't a CW person, please come and see (and admire?) some one that does.

I have some good news to report. Joe Schwarz N9UX has agreed to take over the operation and update of the club web site. Thanks go out to Joe on behalf of the board and the membership. Please take a moment to thank him personally the next time you see him. In all honesty, the board touched on shutting down the web site rather than letting it go without updates. While on the subject, take a moment to thank our out-going web site master, Brian White K9LCQ. Brian updated the web site from its old appearance to what it looks like today and took on maintenance in a temporary role a few years ago. He has kept the site running for much longer than was ever expected of him. Thanks Brian.

You may have noticed my president letters have taken on a one word beginning. It's a quick way to get started on a topic. Here is another….

WX. The weather has been terrific the last month and it as taken a toll on my personal radio activities. I expect this is the same for other club members. I hope this is at least part of the reason for a lull in club activities. As the days get shorter, I expect to dedicate more time to club activities. One of these activities is to name some new officers. We are still looking for someone to fill the Treasurer and Secretary positions. Since we aren't getting volunteers, it is time to start making some calls. If you are called, please consider this a compliment and seriously consider helping run this club.

Remember, this is YOUR club and is what you make it.

Speaking of activities, we should hear about the planning and date for the Christmas party this year at the meeting. If you aren't at the meeting, watch the Yahoo Group for an announcement.

Lastly, speaking of activities or more precisely the lack of activities. There is some discussion about cutting down on the number of meeting held by the club. The low attendance in the last year and the lack of volunteers is generating the appearance of little interest in MRAC. I'm not sure reducing activity is a good way to rebuild the club and get it more active. Let us know your opinion before decisions are finalized and its too late to influence the outcome.

As always, I would like to know what you think about anything in this column or about the club in general.

Mark AB9CD

MRAC Officers:

Terms Expiring in 2010

- President – Mark, AB9CD
- V-President-Brian, K9LCQ
- Secretary – Vacant
- Treasurer – Vacant
- Director – Dave,WB9BWP
- Director – Dave,KA9WXN

Terms Expiring in 2011

- Director – Al, KC9IJJ
- Director – Howard, AB9FH
- Director – Mike, KC9CMT

The Club Phone Number is: (414) 332-MRAC or

(414) 332- 6 7 2 2

Visit our website at:

www.w9rh.org

Mail correspondence to:

M. R. A. C.

P.O. Box 240545

Milwaukee, WI 53223

Membership Meeting Minutes

Meeting called to order at 7:10 PM.

There were 15 in attendance.

No secretary report available.

Treasurer report given by Mark AB9CD. Motion to accept by Michael KC9CMT. Second by K9MJJ. Motion carried 15-0.

The open officer positions were discussed. The club also needs a new web site master. Volunteers welcome. Direct contact will be done before next membership meeting.

The idea of creating special interest groups was presented as a possible club offering. These groups could help in greeting new members at meeting once their interests were determined and help them feel more welcome.

Jerry, K9FI is holding an "after meeting" meeting at Denny's and all are welcome to join the group meeting there.

The BOD is in the process of reviewing members that qualify for life member status per the club bylaws. The down side of following the bylaws is new life members will no longer pay dues. The club is currently under the minimum membership level to cover our annual expenses. Any member aware of any member that qualifies for life member status (including themselves) should contact a BOD person.

Al, KC9IJJ talked about the Christmas Party. The party will be a joint with MAARS. December 5th is the target date. Al will inform via the Yahoo Group is the date is available or what the alternate date is if the 5th is not available. The two groups need a minimum of 25 people to hold the reservation. The group was reminded the party is open to all; members, non-members, family, etc.

It was noted that the club needs approximately 80 paid memberships to cover the annual costs of MRAC.

The club needs a volunteer for the Field Day Coordinator position. This will be mentioned monthly until we get a volunteer or time runs out and MRAC misses it's first Field Day ever. A few people working in a committee format is preferred as the work may be easily divided and not tax any one individual person.

Only about half the members have signed up for the club Yahoo Group. Please sign up if you haven't as many club announcement will be found only on the Yahoo Group between meetings. The group is moderated by Dave, WB9BWP and handle invitations and approvals. Goto http://groups.yahoo.com/group/MRAC-W9RH/ to sign up if you've lost the past invitations. Mark AB9CD will assist anyone needing guidance in getting signed up.

The club has a new PO Box. Our new address is PO Box 240545, Brown Deer, WI 53223.

Next month's program will be mobile HF CW by Pat, WW9R.

Meeting adjourned at 7:55 PM and was followed by the monthly after meeting raffle.

Respectfully Submitted,

Joe, N9UX (recording secretary)

Mark, AB9CD (transcribing)

Board of Directors Meeting Minutes

Meeting called to order at 6:58 PM.

Present: WB9BWP, K9LCQ, KC9IJJ, KC9CMT, KA9WXN, AB9CD

Secretary report by Dave, WB9BWP. Motion to accept by K9LCQ. Second by KC9CMT. Accepted by a vote of 6-0

Treasurer report by Mark, AB9CD. Motion to accept by K9LCQ. Second by KA9WXN. Accepted by a vote of 6-0.

New PO box has been rented. PO Box 545240, Milwaukee, WI 53223. Need to change address with ARRL and other business contacts.

Need to alter the w9rh@arrl.net email address contact.

History archives exceed size of CD. DVD now needed. It was suggested to try Lightscribe DVDs to present professional product to promote club. Suggested DVDs be sold to non-members for $5 each, to members for $2 each. The real purpose of DVDs is as a recruiting tool and may be given away for free. Having an "official" price prevents copies being taken w/o any intent of viewing and creating another cost to the club w/o a return.

Club needs to fill secretary and treasurer positions.

Reminder: KC9CMT has the key to open up the church on meeting nights.

AB9CD shall mail a list of members to be considered for one-on-one contact for open club positions.

AB9CD to contact Joe, N9UX as possible new web site master.

Programs:

August – Christmas party presentation

Yahoo Group activity

Discuss club activities – what does the membership want?

September – Mobile HF CW operation
October – Big Antennas, Dick, WB9JBE

November – D-Star, KA9WXN

Show and Tell idea… allow members to bring in or discuss item / topic for 5 minutes at each meeting.

Ask AES if they would like to present new equipment presentations.

Motion to adjourn the meeting by K9LCW at 8:10 PM. Second by KC9CMT. Vote 5-1.

Respectfully submitted,

Mark AB9CD

From the ARRL Weekly Bulletin

GET SET FOR THE 2009 SIMULATED EMERGENCY TEST

It's time to get ready for the 2009 ARRL Simulated Emergency Test! ARRL Field Organization leaders are planning an event that will actively involve members of the Amateur Radio Emergency Service (ARES), the Radio Amateur Civil Emergency Service (RACES), the ARRL National Traffic System (NTS) and many other related groups that prepare for and respond to emergencies. Public service agencies and organizations in your community, ARRL Section or state will also be invited to participate. You, too, are invited to be a part of this ARRL sponsored nationwide exercise on October 3-4, 2009, or whenever it is held in your area.

Although October 3-4 is the focal point weekend, ARRL Sections, ARES teams and nets may conduct their exercises anytime -- and especially during September through December. If you don't know who to contact, please touch base with your ARRL Section Manager and/or Section Emergency Coordinator or Section Traffic Manager for assistance. See page 16 of QST for Section Manager contact information or check the ARRL Web site <http://www.arrl.org/sections/>. From there, you'll find links to ARRL section pages with appropriate contact information. There can be a role for you no matter what your level of experience. After all, it is a training opportunity to try out something new under simulated emergency conditions, learn or practice useful skills in traffic handling and net operation, and observe emergency communications protocols and management.

ARRL Field Organization officials in your area and Section are planning the simulated emergency scenarios that will be used during the SET event. These scenarios are designed to help you gain valuable operating experience, or to practice what you have learned previously or to put your Amateur Radio Emergency Communications Course training into action. In any emergency -- real or simulated -- a number of public service or public safety agencies and organizations are often also involved in the response.

ARRL Section Leaders and local or district-level leaders are encouraged to work closely with these served agencies, and the SET is a great chance to demonstrate the capabilities of Amateur Radio in the community and beyond. For more information on whom the ARRL maintains a National Memoranda of Understanding with, check this page <http://www.arrl.org/FandES/field/mou/>. Guidelines and specific SET reporting forms for ARRL Section and Field Leaders will be posted online <http://www.arrl.org/FandES/field/forms>. Please report your SET activities to your Section Leaders and to HQ.

SUITSAT-2 NOW CALLED ARISSAT-1

The SuitSat-2 project -- an Amateur Radio satellite housed in a Russian spacesuit -- now has a new name to go with a new shape: ARISSat-1. On Wednesday, August 19, Amateur Radio on the International Space Station

(ARISS) <http://www.rac.ca/ariss/oindex.htm> Chairman Gaston Bertels, ON4WF, announced the new name for the satellite and project. According to ARRL ARISS Program Manager Rosalie White, K1STO, the project team is moving ahead, using the same hardware that was to fly in the Russian Orlan suit. Russia will continue to call the satellite Radioskaf-2, so ARISS is designating it ARISSat-1/ Radioskaf-2.

Plans to launch a second SuitSat-spacesuit-turned-satellite were the subject of discussions and presentations at the November 2006 AMSAT Space Symposium and ARISS International Delegates' meeting. Despite a weaker-than-anticipated 2 meter signal, SuitSat-1 sparked the imagination of students and the general public and turned into a public relations bonanza for Amateur Radio <http://www.arrl.org/ARISS/Suitsat.pdf>. ARISS hopes to capitalize on the concept by building an even better SuitSat that will include ham radio transponders. The SuitSat.org Web site <http://www.suitsat.org/> attracted nearly 10 million hits during the SuitSat-1 mission. Designated by AMSAT as AO-54, SuitSat-1 remained in operation for more than two weeks, easily outlasting initial predictions that it would transmit for about a week. SuitSat-1 re-entered and burned up in Earth's atmosphere in September 2006. ARISSat-1/Radioskaf-2 is expected to be live for at least six months.

Due to storage considerations, the two surplus Orlan space suits in storage on the ISS were discarded via the Progress Cargo Vessel earlier this year. One of these suits was to be used to house the electronics for the upcoming SuitSat-2 mission; the batteries were to be mounted inside the suit, solar panels attached to the extremities with the electronics, video cameras and antenna mounted on the helmet by the ISS crew prior to deployment during an extra-vehicular activity (EVA), commonly called a spacewalk. The removal of the Orlan space suits from ISS removes the "Suit" component of the deployment and the new name reflects the change in configuration.

White told the ARRL that the ARISSat-1/Radioskaf-2 team, through Gould Smith, WA4SXM, made the final decision for the satellite to be square, with solar panels on all 6 sides. "The team is mounting a 70 cm quarter-wave whip on the bottom and a 2 meter quarter wave whip on the top," she said. "All of the hardware and software goes inside the square, and cameras go on the outside." The experiment being developed by Russia's Kursk State University is expected to be integrated into the electronics once the US-produced equipment is delivered to Russia this fall.

AMSAT **<http://www.amsat.org/>** and ARISS pointed out that the importance of this project to both organizations is not diminished. "ARISS sees this mission as an important component of education outreach, as it will provide an opportunity for students around

ARRL Weekly Newsletter Item Concluded

the world to listen for recorded greetings from space, as well as learn about tracking spacecraft in orbit," White said.

The ARISSat-1/Radioskaf-2 transmitter and receiver will be based on a Software Defined Transponder (SDX) system. It will consist of two major components: The RF Module and the Digital Signal Processor (DSP) module. In the RF module, there will be an up converter that receives a signal from the DSP module as a 10.7 MHz intermediate frequency RF signal with a 50 kHz bandwidth, and up converts it to 145 MHz signal of 50 kHz bandwidth centered on 145.9375 MHz. The receiver is a down converter with a 50 kHz bandwidth centered on 437.6125 MHz. The output of the receiver is a 10.7 MHz RF signal with a bandwidth of 50 kHz. The DSP processor receives the 10.7 MHz signal from the receiver down converter and processes it and outputs a 10.7 MHz signal to the transmitter up converter. The DSP can also inject signals such as the CW ID, telemetry, audio and packet signals as determined by the software on the DSP.

AMSAT calls the deployment of the SDX "a critical milestone" for the organization. "This upcoming flight provides an opportunity to flight test the next generation of spacecraft hardware," Bertels said. "Lessons learned from this deployment will be applied to future flight opportunities as AMSAT moves towards a 'modularization approach' to spacecraft development with the expectation the future spacecraft missions will utilize a derivative of SDX and the associated hardware."

The ARISS International Team has been informed that there is still space available for shipment of the ARISSat-1/Radioskaf-2 electronics on the projected cargo flight to the ISS in January 2010, and the extra-vehicular activity scheduled for April 2010 still has a SuitSat-2 deployment on the schedule.

Next Regular Meeting

The next meeting will be September 24th at 7:00PM. We meet in the Fellowship Hall of Redemption Lutheran Church, 4057 N Mayfair Road. Use the south entrance.

Please do not call the church for information!

Club Nets & Breakfast

Please check in to our nets on Friday evenings.

Our ten meter SSB net is at **8:30 p.m.** at **28.490 MHz USB.**

Our two meter FM net follows at 9:00 p.m. on our repeater at **145.390 MHz** with a minus offset and a **PL of 127.3 Hz.**

Join us for Saturday morning breakfast at **Maxim's Restaurant, 18025 W. Capitol Dr.** We usually meet at around 8:00 a.m., and order around 8:15 a.m. The food and the company are good and;

You don't have to be a member of the club to join us!

Visit our website at: **www.w9rh.org**

Or phone (414) 332-MRAC or 332 - 6722

Club Repeater,
145.390Mhz Minus Offset
(127.3 PL)

Chatter Deadline

The **DEADLINE** for items to be published in the **Chatter** is the 15th of each month. If you have anything (announcements, stories, articles, photos, projects) for the 'Chatter, please get it to me before then.

You may contact me or Submit articles and materials by e-mail at: **Kc9cmt@earthlink.net**

or by Post at:

Michael B. Harris

807 Nicholson RD

South Milwaukee, WI 53172-1447

Experimenter's Bench

Boosting TTL Oscillator Cans to Make a Transmitter (Fireball)

Those New Jersey guys have a great idea: find a "canned" oscillator that operates within a ham band (or a harmonic of a ham band) and turn it into a fixed-frequency CW transmitter. You can't pull a great deal of power out of these (about 50 mw) so adding a non-linear amplifier is in order.

Output from a "canned" Oscillator

Of course, the output is at a TTL level: a squar(ish) wave between zero and five volts. But most TTL outputs are not at all linear. This means that available drive current varies, depending on the output voltage. Standard TTL outputs are pretty good at pulling current toward ground (at the "zero" volt level), but they're none too good at outputting current (at the "five-volt" level). Unfortunately, a power amplifying transistor needs significant current coming out of the driver, and into its base. A PNP final amp would work better than an NPN transistor, but NPN finals are much more common.

You could add a tuned circuit between the oscillator output and base: with appropriate impedance matching, you could get enough base drive. This is the solution that the N.J. "fireball" rig uses. A five-element PI filter is used between the TTL output of the oscillator and the base of the amplifying transistor.

Another approach is to boost the TTL drive available with a bus-buffer TTL chip. These have more current output, and more significantly, can drive much more current into the base of the final amp.

Adding a few in parallel helps provide even more drive. By using a tri-state buffer, the output drive can be turned on and off with a TTL-compatible keying signal (or the collector of a NPN keying transistor, with its emitter grounded).

With this approach, a simpler base-drive circuit works fine, and no tuned circuits are needed, except after the final amp.

The 74F125 chip has four buffers. The remaining unused buffer could be employed as a TTL oscillator, if you happen to have a bare crystal rather than a canned oscillator.

Choice of buffer chips

There are a LOT of suitable buffers that'll do the job. I've chosen one that was cheap and available. It is available in a number of different logic families, including standard TTL, low-power shottkey TTL (LS), advanced schottkey TTL (AS), Fast TTL (F), High-speed CMOS (HC), and Advanced CMOS (AC). At 28MHz, we require that the buffer switch between zero and five volts quickly. And we need the high output current too.

Chip	OK?	why?
74125	no	too slow, not enough drive current
74LS125	no	not enough drive current
74ALS125	no	fast enough, but marginal drive current
74HC125	OK	could be better if faster: can run up to 7v supply.
74AC125	good	very fast, low output resistance (lots of drive)
74AS125	good	very fast, pretty good output drive
74F125	good	very fast, pretty good output drive

Output Amplifier

You could use a 2N2222A, but its a bit skimpy on heat dissipation. A TO-39 transistor like 2N3553, or 2N3866 is safer. To get reasonable power out, its collector should be biased at more that 5v. A 12volt supply is almost standard. But all the TTL circuitry requires something close to 5v. A 78L05 regulator will work fine, but the arrangement shown is cheaper. A simple NPN plastic-case transistor is biased to drop the 12v supply down for all the TTL circuits. If your 12v supply is adjustable, then tweak its voltage so that the TTL gets close to +5v on their supply pins.

The base-drive circuit for the final amp was tried with a 74LS125 and a 74F125. With the 74LS125, output power was about 200mW. With the 74F125, output power increased to 1.6W. Some of the resistor values could be tweaked in order to drive the final amp at a 50% duty cycle, or a bit less. If its overdriven (past 50% duty cycle), efficiency suffers. With 74F125, total transmitter efficiency is about 50% - that's about all you can expect.

The output five-element PI filter uses air-core self-supporting coils, mounted above a printed circuit board. These were pre-tuned by tacking a 100pf capacitor in parallel, and finding resonance with a grid-dip oscillator. All capacitors are silver-mica. The filter was designed for 35 ohms input Z, 50 ohms output Z. It has a chebychev response with 0.1dB ripple. Cutoff frequency was a little higher than 29MHz to make sure that capacitor tolerances will allow 28MHz to pass with no loss.

May I recommend Bob Lombardi's **FDS2** program for designing these type filters. It is available via FTP from the QRP-L archives.

FDS2 5-elemet PI filter values:

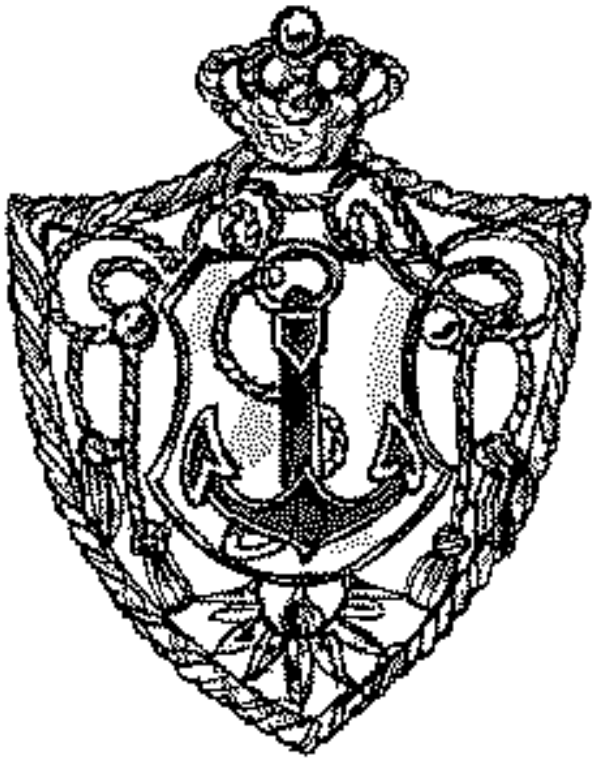
C4	177pf
L1	259nH
C5	259pf
L2	370nH
C6	124pf

I started with Bob's **AIRWNDL** program to find how to wind L1 and L2. After checking with a grid-dip oscillator, their inductance was a bit high. This is likely because when winding onto a convenient 1/4" shaft of a variable resistor, the coil diameter increased while the coil "relaxed" after winding. A turn or two was removed, leaving L1 at about 7.5 turns, and L2 at 10 turns. These coils were not stretched: there's no air space between turns.

RFC2 is a commercial molded choke. RFC1 was lifted from a PC plug-in card . It had filtered a serial-port output line. A ferrite bead with three turns should work well too.

A 120 pf capacitor could be used for C6, but I used a 47pf in parallel with a 75pf (both silver mica). You can make up many non-standard values with two smaller caps in parallel. The RF current will divide between the two caps, so if they're lossy, parallel caps will do better than a single lossy capacitor.

A small finned headsink was added to Q1, since it does get warm.



The Beginnings of Wireless Radio:

Wireless , the Early Years.

In this review, "pliotron" is the name which General Electric used for its vacuum-tubes.

General Electric Review, October, 1920, pages 807-812:

Duplex Radiophone Receiver on U.S.S. *George Washington*

By HAROLD H. BEVERAGE

RADIO ENGINEERING DEPARTMENT,

GENERAL ELECTRIC COMPANY

In arranging for duplex or two-way communication between the *George Washington* and land stations, one of the major difficulties encountered was the prevention of each receiver from being affected by the powerful interference of its own transmitter. This problem as applying to the land station at New Brunswick was solved by separating the transmitting and receiving stations a distance of four miles. The solution employed on the *George Washington* was of necessity totally different. A description of the schemes used, with particular reference to receiving, is given in the following article. Extracts from the ship's log are included to show the successful performance of the equipment.--EDITOR.

Introduction

On February 22, 1919, Secretary of Navy Daniels, sitting at his desk in Washington, picked up his telephone and spoke a few words of greeting to President Wilson, then 800 miles at sea on the U.S.S. *George Washington*.

Secretary Daniels' voice was carried over the regular toll line from Washington to the Naval Radio Station at New Brunswick, N. J., where the voice currents were amplified to such an extent as to modulate the output of an Alexanderson alternator. This modulated energy was radiated from the New Brunswick antenna and was picked up on the *George Washington*.

Previous to this demonstration, the operators on the *George Washington* had heard New Brunswick's radiophone while the ship was lying at anchor in Brest Harbor, France.

The results of these tests were so encouraging that the Navy Department decided to install a powerful radiophone on the *George Washington*, to enable the ship to talk back to the shore. The General Electric Company was asked to furnish the radiophone equipment, both transmitting and receiving.

Requirements for Two-way Radiophone Conversation

In order to make a two-way conversation possible over a radiophone, it is necessary either to shut off the transmitting set when receiving, or to so arrange the receiving apparatus that it will be unaffected by the powerful interference from the local transmitter.

On small radiophone sets the first method is often used, the transmitter being started and stopped by a convenient push button located on the microphone support. More or less confusion is likely to result from this method of control, as it is impossible for the party talking to hear the other party until he releases the push button, thereby shutting off his transmitter. This method of operation is not readily adapted to remote control over a long-distance toll line.

On high-power radiophones, particularly where an alternator is used to supply the radio frequency energy, the push button method of control is impractical, if not impossible in many cases. For these reasons, the second or duplex method for two-way conversation was chosen for both New Brunswick and the *George Washington*.

Duplex Arrangements at New Brunswick

At New Brunswick, Mr. Burke Bradbury made arrangements for duplex operation by setting up the receiving apparatus at a point about four miles from the radio station, and sending the amplified received currents back to the radio station over an existing telephone line connecting New Brunswick with the Marconi receiving station at Belar.

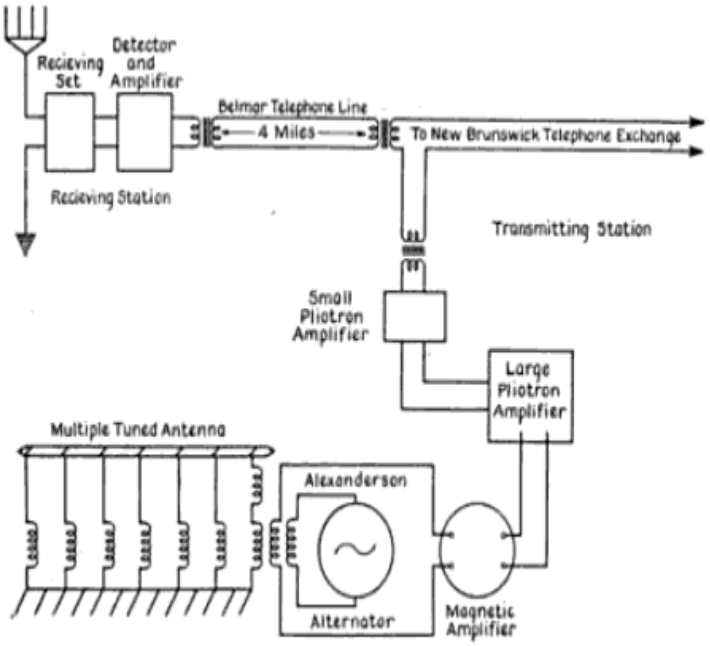


Fig. 2. Connection Used for Duplex Operation at New Brunswick Station

Fig. 2 shows the connections used for duplex operation at New Brunswick. It will be noted that the received currents are introduced in series with the toll line leading from New Brunswick, enabling the party talking from Washington or any other point to hear the incoming radiophone speech over the same wires which transmit his own speech to New Brunswick, as in an ordinary land wire connection. It is also evident that, with this connection, the speech and signals picked up by the receiving apparatus at New Brunswick will modulate the alternator output and be re-radiated again at New Brunswick's wave length. Anyone listening on New Brunswick's wave length would, therefore, hear both sides of the conversation. This explains a point which puzzled many amateur operators, who reported that they heard the George Washington radiophone on 8000 or 13,600 meters, whereas the wave length of the radiophone on the *George Washington* was 1800 meters. The wave lengths of 8000 and 13,600 meters were both used at New Brunswick for radiophone tests at various times. The writer often heard short wave spark signals while listening to the New Brunswick radiophone on the *George Washington*, the signals being picked up by the receiving apparatus at New Brunswick and being re-radiated in the manner described.

Duplex Arrangements on U.S.S. *George Washington*

The solution for duplex operation on the *George Washington* was necessarily different than for New Brunswick, as the receiving and transmitting apparatus could not be located at different points as at New Brunswick. The problem which presented itself, therefore, was to provide receiving apparatus sensitive enough to respond loudly to received currents of a few millionths of an ampere

stretched from the same masts as the receiving antenna.

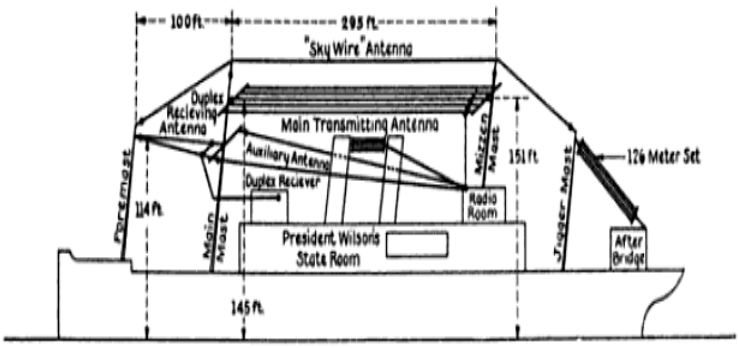


Fig. 4. Arrangement of the Separate Receiving and Transmitting Antennae on the U.S.S. *George Washington*

As a solution for this problem, Mr. E. F. W. Alexanderson, Chief Engineer of the Radio Engineering Department, suggested the circuit shown in Fig. 3. This circuit was first tried out in Schenectady, using the same antenna for both receiving and sending. It was found possible to receive signals from Europe on long wave lengths and at the same time radiate ten amperes at 4000 meters on the same antenna, using either an Alexanderson alternator or a pliotron oscillator as the source of energy.

On the *George Washington*, however, separate receiving and transmitting antennae were used, arranged as shown in Fig. 4.

Fig. 3 shows the connections used in the duplex receiver on the *George Washington*. The current from the receiving antenna divides through two parallel branches; C_1 being one branch, and FC_2, the second branch. The "frequency trap" F is tuned to the transmitting wave length of 1800 meters, and offers an impedance of about 250,000 ohms at 1800 meters, but a very low impedance to long wave lengths. The condenser C_1 has a capacity of 0.006 microfarads, and offers an impedance of about 160 ohms at 1800 meters. As the primary L_1 of the receiving set is in series with the frequency trap, the interference from the local transmitter is reduced in the ratio of the impedances of the two branches to 1800 meters, or 160/250,000, so that the interference is reduced to 0.6 of one per cent of the interference that would be experienced without the filter circuit. The remaining interference is so small that it is easily taken care of by tuning alone.

The variable condenser C_2 tunes the primary of the receiving set to the long wave length which it is desired to receive. The inductance of the frequency trap F enters into the tuning of the primary circuit, and therefore the frequency trap offers practically no impedance to the long waves. The branch FC_2L_1 offers only a few ohms effective resistance to the long wave length to which it is tuned, while the branch C_1 offers a comparatively high impedance, about 1200 ohms for 13,600 meters. It is, therefore, possible to receive the long waves at practically full intensity, and yet render the receiver very insensitive to the effects of the powerful radiation from the local transmitter.

The remainder of the apparatus is the same as is used for receiving telegraph signals, excepting that it is adjusted to receive a wider band of frequencies than a telegraph receiver, in order to receive all components of the telephone wave necessary for clear speech. If the receiver is too sharply tuned, the quality of the telephone speech on long waves is very poor, because only one frequency is received antenna .

Some idea of the effectiveness of the duplex feature of the receiving set may be gained from the following demonstrations: When the pliotron transmitter on the ship was in operation, radiating about 30 amp. on the main antenna at 1800 meters, the receiving antenna was sufficiently exposed to light a 40-watt lamp to full brilliancy when the lamp was placed in series with the receiving antenna. The intensity of the interfering current reaching the receiving set secondary was so small, however, that no interference whatever was experienced above 6000 meters when the pliotron transmitter was being used for continuous wave telegraphy with 150 amp. radiation. When the pliotron transmitter was modulated by voice or buzzer, the modulation could be heard weakly on 13,600 meters, and a little stronger on 8000 meters. The interference from the modulation was never strong enough to interfere with telegraph reception from New Brunswick on either 13,600 meters or 8000 meters, even in Brest Harbor, but it was strong enough to interfere slightly with the New Brunswick radiophone when the ship was several hundred miles away from New Brunswick, as the radiophone intensity was very much less than the intensity when New Brunswick was telegraphing. The interference or "side tone," however, was not loud enough or clear enough to understand; and it was necessary for intercommunication purposes to introduce an artificial side tone enabling the transmitter operator to speak to the receiving operator for changes in control, etc. For duplex telephony the side tone is not only unobjectionable, but is more or less desirable, as it more nearly approximates the conditions in the ordinary land wire telephone.

It was noted that in very wet weather the side tone was appreciably stronger than in dry weather, probably due to leakage currents between the transmitting and receiving antenna over the wet insulators. However, duplex operation was satisfactory in very wet weather, with a few exceptions. On one or two occasions, it was found that wet halyards swinging against the receiving antenna produced more or less inductive disturbance when the transmitter was working. During rough weather, when the ship was rolling and pitching badly, it was sometimes quite difficult to keep the receiver quiet when the transmitter was in operation. Loud inductive disturbances, synchronous with the rolling or pitching of the ship, were observed several times. In each case, the source of disturbance was found to be an antenna lead-in grounding somewhere on a metal stay or some other grounded metal object. As there were about twelve antennas on the ship, it was sometimes difficult to locate the source of disturbance immediately. It was found necessary to insulate each antenna lead-in carefully in such a manner that it could not swing against a grounded object when the ship was rolling and pitching in a storm.

Extracts from Log

Mr. John Payne and the writer made two trips to France on the *George Washington*. On the first trip, the ship sailed from Hoboken on April 11th. Due to the short time available for installing the radiophone, the ship was out of range before arrangements were completed for duplex operation and no duplex conversations were tried.

During this trip, the New Brunswick radiophone was operated at a wave length of 13,600 meters with an average antenna current of 120 amps. The New Brunswick radiophone was operated on definite the return trip from Brest, the New Brunswick radiophone was heard, but not understood, as soon as the ship left Brest Harbor. At a distance of 2000 miles from New Brunswick, complete sentences and orchestra selections were recognized on the ship. The orchestra music was obtained by placing a telephone near the orchestra at the New Brunswick Opera House, and also at the Hotel Klein. At a distance of 1200 miles practically all of New Brunswick's speech was understandable under normal static conditions.

Duplex Radiophone Continued:

Due to very unfavorable static conditions, duplex conversations were not satisfactory until the ship was about 200 miles from New York, on the morning of May 5th. After establishing satisfactory duplex conversation with the engineers at New Brunswick and Navy officials in Washington, Secretary of War Baker on the *George Washington* held a conversation with Assistant Secretary of Navy Roosevelt in Washington. Secretary Baker remarked that "the connection was as good as over an ordinary toll line."

The *George Washington* sailed from Hoboken again on May 10th. The first duplex conversations were held while a heavy sea was running and in a driving rain, and considerable difficulty was experienced from inductive disturbances caused by the lead-in on unused antenna; swinging against grounded objects. Later, fairly satisfactory conversations were held with New Brunswick up to a distance of about 400 miles from New York. At that distance, very bad static was experienced which made the reception unsatisfactory on both ends, particularly on the *George Washington*. After the ship was about 800 miles out the static conditions on the ship end were much improved, so that New Brunswick was easily understood again. New Brunswick could hear the *George Washington* at this distance, but could not understand the speech well enough to work duplex satisfactorily.

While the *George Washington* was lying at anchor in Brest Harbor, some radiophone tests were made at New Brunswick, using a wave length of 8000 meters. During these tests, the average antenna current at New Brunswick was about 50 amp., as compared with an antenna current of 120 amp. at 13,600 meters. At night, the 8000-meter wave length radiophone was received much clearer and stronger than the 13,600-meter wave length, but very little was understood due to interference and static. However, it was possible to recognize selections sung at New Brunswick. On one occasion, Mr. W. W. Brown's voice was clearly recognized singing "America." Sometimes, at night, the 8000-meter wave with 50 amp. average antenna current was received by heterodyne note as strong or stronger than the 13,600-meter telegraph wave with an antenna current of 350 amp. In the daytime, the conditions were reversed, and the 13,600-meter wave length was received much stronger than the 8000-meter wave length. In fact, it was often impossible even to pick up the 8000-meter wave length in Brest Harbor in the daytime, although at night the same radiation was very strong.

The *George Washington* sailed from Brest again on June 29th with President Wilson and party aboard. When the ship was 2400 miles from New York, New Brunswick began to make tests comparing the 8000-meter and the 13,600-meter wave lengths with 50 and 120 amp. average antenna current respectively. The first test was run at night, and the 8000-meter radiophone was understood fairly well at this distance of 2400 miles, while the 13,600-meter wave length could not be understood due to static, although the radiation in amperes was over twice as great. The next test was made on the

Conclusion

On all trips, New Brunswick was received well up to about 300 or 400 miles. Between 300 and 500 miles from New York, the reception of New Brunswick radiophone was generally comparatively poor on every trip, due to very strong static. Beyond 600 miles from New York, the reception on the *George Washington* was generally good again on all trips. The static conditions seemed to be most unfavorable on the western edge of the Gulf Stream, and all signals appeared to be comparatively weak there.

During all of these tests, the New Brunswick radiophone was received with the detector oscillating at zero beat. Non-oscillating detector reception was also tried, using a multistage radio frequency amplifier. Good reception was obtained, but it was found more practical for duplex operation to use the oscillating detector, as it was not as subject to interference from the transmitter as the radio frequency amplifier system, due to the fact that the radio frequency amplifier tended to amplify the high-frequency harmonics from the transmitter to a great extent.

The duplex reception with the zero beat method of reception with oscillating detector was very satisfactory. Under normal conditions, the static produced a much louder sound than the side tone from the local transmitter, so that the distance that it was possible to receive New Brunswick's radiophone successfully was limited by the static rather than the side tone from the local radiophone transmitter. The master oscillator method of generating the radio frequency energy used by Mr. Payne on the *George Washington* radiophone produces a wave which is remarkably free from harmonics.

When the pliotron set was being used for continuous wave or buzzer modulation telegraphy, sending commercial messages to Otter Cliffs, Maine, it was found possible to stand watch on New Brunswick without the slightest interference from the pliotron transmitter. This feature may be found useful in the future on large ships with heavy traffic, as it enables them to send and receive simultaneously. With this type of duplex, it is possible to work down to within about twice the wave length of the transmitter when the transmitter is being used for continuous wave telegraphy. following day, with daylight. The distance between New Brunswick and the *George Washington* was about 2000 miles. Both wave lengths were received about the same on this occasion. From this point on the 8000-meter wave length was received better than the 13,600-meter wave length, day or night. From a distance of 1600 miles until the ship docked, the 8000-meter radiophone was understandable at most schedules excepting when there was interference from Glace Bay.

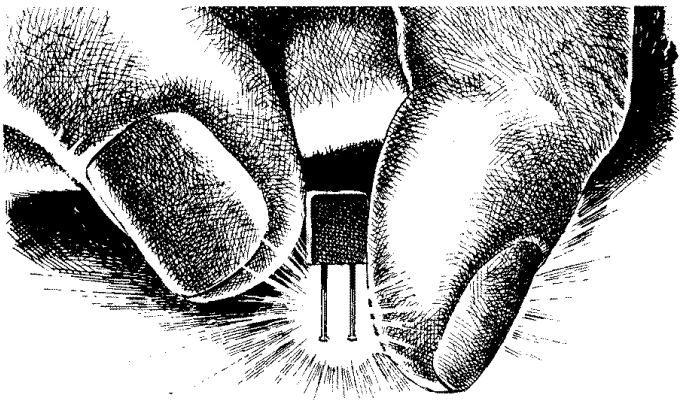
The first duplex conversation on this trip was held on July 7th, when the *George Washington* was about 375 miles from New York. The first conversation was not very satisfactory, due to static and interference at New Brunswick. Later in the day, fairly satisfactory duplex conversations were held between New Brunswick and the *George Washington*, but it was necessary to repeat some of the sentences several times before they could be understood. It was decided that the conditions were not quite favorable enough for President Wilson to talk, and it was hoped that the static conditions would improve later in the day. The static conditions became worse, however, so the presidential conversation was deferred until the following day. On the following morning, satisfactory communication was established, and the President was able to send a message over the

The Beginnings of Wireless Radio:

Wireless , the Early Years. Conclusion

Radiophone to Assistant Secretary Roosevelt via radiophone to New Brunswick and thence to Washington over the toll line. schedules during the day and evening, and was received consistently up to about 1200 miles, with the exception of a few schedules when the ship was in the gulf stream, and heavy static interfered with reception. The speech was partially understood up to 2500 miles when the static conditions were favorable, and was heard but not understood at still greater distances. of thirty or more amperes at 1800 meters, radiating on an On strongly and other frequencies are suppressed. For long wave telephony, it is very essential to tune the receiver in such a manner that it is capable of receiving a band of frequencies within about 1000 cycles on either side of the carrier wave. On short wave lengths, 1000 cycles is a very small per cent of the carrier frequency and an ordinary sharply tuned telegraph receiver will receive telephone speech clearly. On wave lengths above 10,000 meters 1000 cycles is several per cent of the carrier frequency, and the average telegraph receiver is tuned too sharply to receive all of the frequencies necessary for clear speech, the speech sounding muffled and being very difficult to understand. With broad tuning, however, the long wave length speech may be received clearly with good quality.

The adjustment of the duplex feature of this receiver is very simple. First, the receiving set is tuned to the wave length it is desired to receive. Then, the frequency trap *F* is adjusted until the interference and noise produced by the local transmitter disappear and the distant signals are heard clearly. The frequency trap adjustment is very sharp, and in the case of the *George Washington* the radiation from the transmitter was so powerful that the detector bulb was rendered inoperative until the frequency trap condenser was within a very few degrees of the correct position



At the time the Titanic sank in 1912, there were no laws regulating radio in the United States, and for years there had been complaints about interference caused by undisciplined amateur operators. In the hours following the Titanic's sinking, amateurs were blamed, perhaps unfairly, for causing problems in getting accurate information from the rescue ships. In any event, this extract reports how, during the next night after the sinking, amateur transmitters around New York City voluntarily maintained complete radio silence, in order to aid the reception of signals coming from ships reporting Titanic information.

Wireless & The Sinking of the Titanic

The Book of Radio, Charles William Taussig, 1922.
Pages 203-205:

Many other stories of amateur usefulness in times of trouble can be told. The author recollects a case of such assistance, which was rendered by amateurs on April 15, 1912. On the previous day, the *Titanic* had struck an iceberg and sunk with an appalling loss of life. Effort was being made to rush a list of the survivors to the newspapers, but owing to the severe atmospheric conditions, the scout cruiser *Salem* near the scene of the disaster was finding it difficult to get the names through to the naval stations at Newport, Rhode Island. This was prior to the radio law, and every evening around Greater New York, the air was full of pleasantries, foolishness, bantering, squabbling, quarreling, jamming in both the Morse and Continental codes, for at that time both of these codes were in use on the wireless. There was no organization then to line up the amateurs and keep them from interfering with the important work that was going on. But that invisible bond which binds them to one another, held them in check that night for the important work to which they were to contribute their share.

New York's little radio population was aghast the morning after, when they read of the horrible disaster. Each and every one thought unto himself, "How can I be of some assistance?" Little by little, news was arriving in New York, giving some of the details of the horrible event. Anxious relatives were awaiting word of the survival of their dear ones. The newspapers told them that the names of the survivors were being held up, due to the severe static disturbances in the ether, and when night came, only a partial list of the survivors had reached New York.

Without being told, and with no organization to get them together, the amateurs of New York and vicinity discovered the part that was allotted to them to render assistance in this tragedy of tragedies. At eight o'clock the evening following the sinking of the *Titanic*, when the author picked up his telephone receivers and tuned in on that little world of ether, he was not greeted by the usual din and noise, but in its stead was an oppressive, awful shroud of silence. Except for the mournful rumblings and grumblings of the static, not a sound was to be heard, and yet every amateur was at his post, with the self-imposed grim task of trying to copy the names of the survivors of the *Titanic* that the valiant little ship, the *Salem*, not far from the scene of the disaster, was trying to get through to the Newport Naval Station. 'Twixt static crashes, they were copying the names of those who were fortunate enough to be saved from a watery grave.

Hour after hour, they copied what little they could get, for the static would at times completely obliterate the signals from the *Salem*. Twice during the long period, the silence was broken; once by the German station in the Trinity Building on Broadway, TWT. Hardly had their loud spark been impressed upon the ether, when the stentorian spark of Dr. Hudson, the most prominent amateur at that time, warned them to keep out. Dr. Hudson was the self-appointed patrolman that night and his spark was the law and no one disputed its authority. Once again during the long night, an amateur sent out a call, but he also bowed to the reproving signals from old "D. R."

All through the night, they labored at their task, and when morning came, fragmentary records of the messages sent out by the *Salem*, pieced together with the messages copied by the Newport Naval Station, enabled the newspapers to bring cheer to the homes of many, by the publication of a full list of the survivors of the *Titanic.*

Testing & Local SwapFests

VE Testing

Testing Session on September 26th at 9am.

Amateur Electronic Supply 5720 W. Good Hope Rd. Milwaukee, WI 53223

Swapfests

November 1, 2009, Davenport Iowa, http://www.arcsupport.com/drac/hamfest.html

November 14-15, 2009, Fort Wayne Indiana, http://www.fortwaynehamfest.com

October 10, 2009, Crown Point Indiana, http://www.qsl.net/w9lj

Working Committees

Field Day

- Open

FM Simplex Contest

- Joe – N9UX
- Jeff – K9VS
- Brian— K9LCQ

Ticket drum and drawing

- Tom – N9UFJ
- Jackie – No Call

Newsletter Editor

- Michael-KC9CMT

Webmaster

- Joe Schwartz—N9UX

Refreshments

- Michael – KC9CMT

Membership Information

The Hamateur Chatter is the newsletter of MRAC (Milwaukee Radio Amateurs' Club), a not for profit organization for the advancement of amateur radio and the maintenance of fraternalism and a high standard of conduct. MRAC Membership dues are $17.00 per year and run on a calendar year starting January 1st. MRAC general membership meetings are normally held at 7:00PM the last Thursday of the month except for November when Thanksgiving falls on the last Thursday when the meeting moves forward 1 week to the 3rd Thursday and December, when the Christmas dinner takes the place of a regular meeting. Club Contact Information Our website address http://www.w9rh.org

Telephone (414) 332-MRAC (6722)

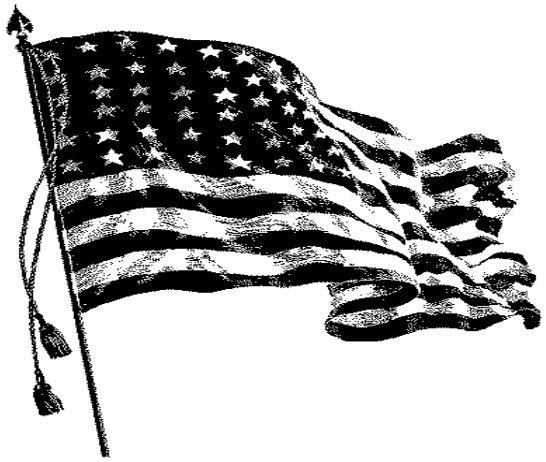
Address correspondence to: **MRAC PO Box 070695, Milwaukee WI 53207-0695**.

Email may be sent to

w9rh@arrl.net

Our YAHOO newsgroup:

http://groups.yahoo.com/group/MRAC-W9RH/



CLUB NETS:

- Our Six Meter SSB net is Thursday at 8:00PM on 50.160 MHz USB
- Our Ten Meter SSB net is Friday at 8:00PM on 28.490 MHz ± 5 KHz USB.
- Our Two Meter FM net follows at 9:00PM on our repeater at 145.390MHz - offset (PL 127.3)

Milwaukee Area Nets

Mon.8:00 PM 3.994 Tech Net

Mon.8:00 PM 146.865- ARES Walworth ARRL News Line

Mon.8:00 PM 146.445 Emergency Net

Mon.8:00 PM 146.865- ARES Net Walworth

Mon.8:45 PM 147.165- ARRL voice news (ARES)

Mon.9:00 PM 50.160 6 mtr .SSB NET

Mon.9:00 PM 147.165- ARES Net Waukesha-Milwaukee

Tue.9:00 AM 50.160 6 . Mtr 2nd Shifter's Net

Tue. 7:00 PM 145.130 MAARS Trivia Net

Tue. 8:00 PM 7.035 A.F.A.R. (CW)

Wed. 8:00 PM 145.130 MAARS Amateur Radio Newsline

Wed. 9:00 PM 145.130 MAARS IRLP SwapNet

Thur. 9:00 PM 50.160, 6 mtr SSB Net

Thur. 9:00 PM 146.910 Computer Net

Fri. 8:30 PM 28.490 MRAC W9RH 10 mtr Net SSB

Fri. 9:00 PM 145.390 W9RH 2 mtr. FM Net

Sat. 9:00 PM 146.910 Saturday Night Fun Net

Sun 8:30 AM 3.985 QCWA (Chapter. 55) SSB Net

Sun 9:00 AM 145.565 X-Country Simplex Group

Sun.10:00 AM 443.800+ FM-38 link to 146.88 Baraboo SWAP Net

Sun 9:00 PM 146.910 Swap Net

Sun 8:00 PM 146.910 Information Net

Sun.8:00 PM 28.365 10/10 International (Milwaukee Ch.) (SSB)

2 meter repeaters are offset by 600KHz - - 70 centimeter repeaters are offset by 5 MHz

SSB frequencies below 20 meters are LSB and for 20 mtrs and above are US